

# **STTH302S**

# HIGH EFFICIENCY ULTRAFAST DIODE

#### MAIN PRODUCT CHARACTERISTICS

I <sub>F(AV)</sub>	3A
V <sub>RRM</sub>	200 V
Tj (max)	175 °C
V <sub>F</sub> (max)	0.75 V
trr (max)	35 ns

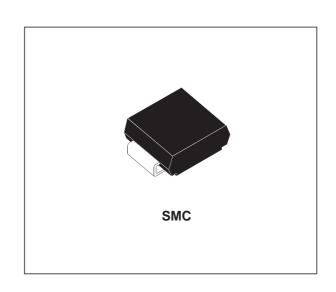
### **FEATURES AND BENEFITS**

- Very low conduction losses
- Negligible switching losses
- Low forward and reverse recovery times
- High junction temperature



The STTH302S, which is using ST's new 200V planar technology, is specially suited for switching mode base drive & transistor circuits.

The device is also intended for use as a free wheeling diode in power supplies and other power switching applications.



### **ABSOLUTE RATINGS** (limiting values)

Symbol	Parameter	Value	Unit
V <sub>RRM</sub>	Repetitive peak reverse voltage	200	V
I <sub>F(AV)</sub>	Average forward current	3	Α
I <sub>FSM</sub>	Surge non repetitive forward current	100	А
T <sub>stg</sub>	Storage temperature range	- 65 + 175	°C
Tj	Maximum operating junction temperature	175	°C

## THERMAL PARAMETERS

Symbol	Parameter	Maximum	Unit	
R <sub>th (j-l)</sub>	Junction to lead	20	°C/W	

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### STATIC ELECTRICAL CHARACTERISTICS

Symbol	Parameter	Tests co	Min.	Тур.	Max.	Unit	
I <sub>R</sub> *	Reverse leakage	Tj = 25°C	$V_R = V_{RRM}$			3	μΑ
	current	Tj = 125°C			4	75	
V <sub>F</sub> **	Forward voltage drop	Tj = 25°C	I <sub>F</sub> = 3 A			0.95	V
		Tj = 125°C	I <sub>F</sub> = 3 A		0.66	0.75	

Pulse test: \* tp = 5ms,  $\delta$  < 2%

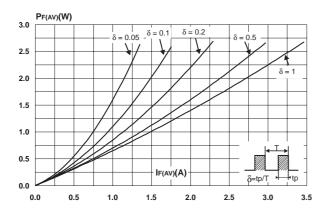
To evaluate the maximum conduction losses use the following equation : P = 0.60 x  $I_{F(AV)}$  + 0.05  $I_{F}{}^2(\mbox{RMS})$ 

### **DYNAMIC ELECTRICAL CHARACTERISTICS**

Symbol	Parameter	Tests conditions		Min.	Тур.	Max.	Unit
trr	Reverse recovery time Tj = 25°C		I <sub>F</sub> =1 A Irr = -50 A/μs V <sub>R</sub> = 30V			35	ns
tfr	Forward recovery time	Tj = 25°C	$I_F = 3 \text{ A}  dI_F/dt = 50 \text{ A}/\mu \text{s}$ $V_{FR} = 1.1 \text{ x V}_F \text{max}$		70		ns
V <sub>FP</sub>	Forward recovery voltage	Tj = 25°C	$I_F = 3 \text{ A} \text{ d}I_F/\text{d}t = 50 \text{ A}/\mu\text{s}$		1.6		V

<sup>\*\*</sup> tp = 380 $\mu$ s,  $\delta$  < 2%

**Fig. 1:** Average forward power dissipation versus average forward current.



**Fig. 3:** Relative variation of thermal impedance junction ambient versus pulse duration (Printed circuit board epoxy FR4).

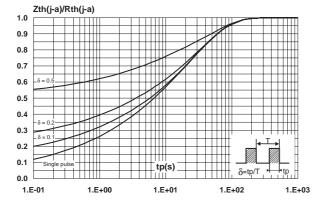


Fig. 5: Junction capacitance versus reverse voltage applied (typical values).

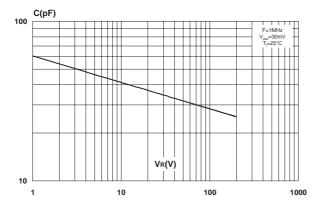
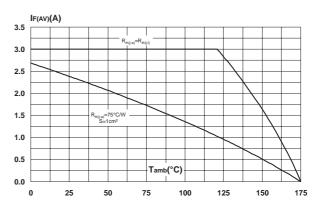
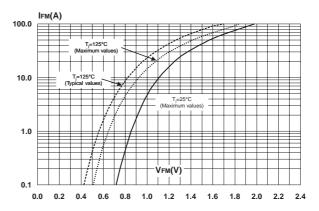


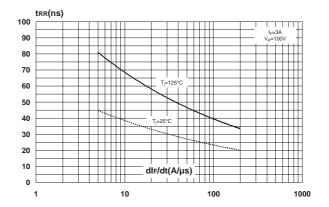
Fig. 2: Average forward current versus ambient temperature ( $\delta$  = 0.5)



**Fig. 4:** Forward voltage drop versus forward current.

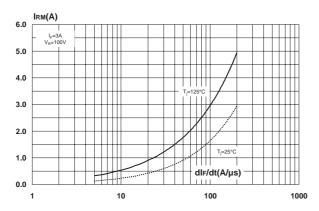


**Fig. 6:** Reverse recovery time versus  $dI_F/dt$  (90% confidence).



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**Fig. 7:** Peak reverse recovery current versus dI<sub>F</sub>/dt (90% confidence).



**Fig. 9:** Relative variations of dynamic parameters versus junction temperature.

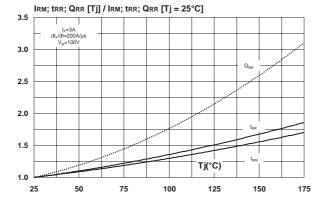


Fig. 8: Reverse recovery charges versus  $dI_F/dt$  (90% confidence).

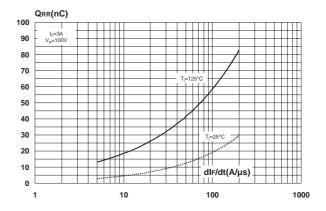
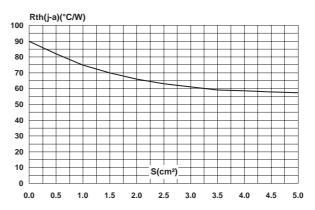


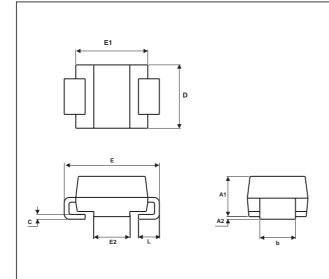
Fig. 10: Thermal resistance junction to ambient versus copper surface under each lead (epoxy FR4,  $e=35\mu m$ ).



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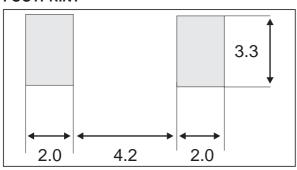
## **PACKAGE MECHANICAL DATA**

**SMC** 



	DIMENSIONS				
REF.	Millimeters		Inches		
	Min.	Max.	Min.	Max.	
A1	1.90	1.90 2.45		0.096	
A2	0.05     0.20       2.90     3.2		0.002	0.008	
b			0.114	0.126	
С	0.15	0.41	0.006	0.016	
E	7.75	7.75 8.15		0.321	
E1	6.60	6.60 7.15 4.40 4.70		0.281	
E2	4.40			0.185	
D	5.55	6.25	0.218	0.246	
L	0.75	0.75 1.60		0.063	

#### **FOOTPRINT**



Ordering code	Marking	Package	Weight	Base qty	Delivery mode
STTH302S	U32	SMC	0.245 g	2500	Tape & reel

■ Epoxy meets UL 94,V0

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